

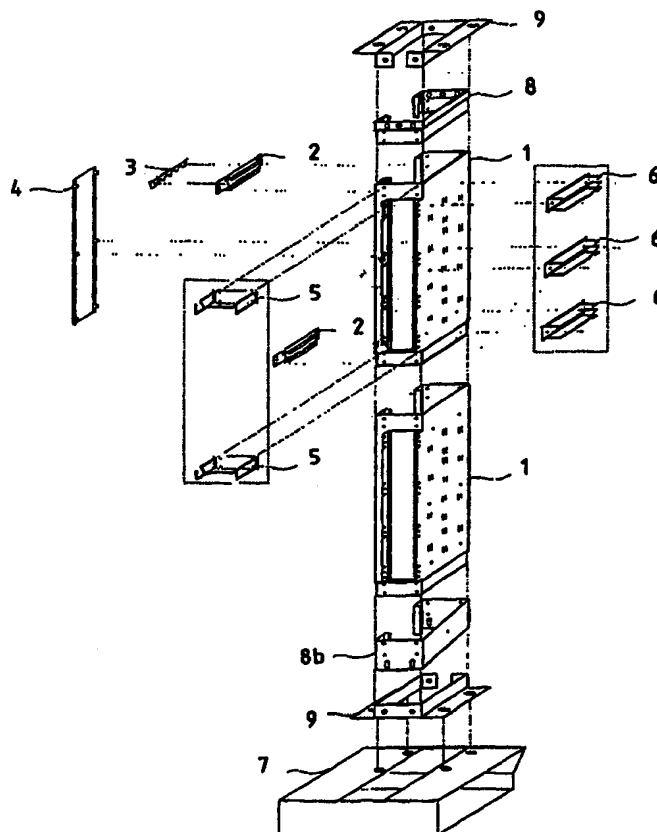


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b>  <b>H02G 3/04</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 98/35413</b>  <b>(43) International Publication Date:</b> 13 August 1998 (13.08.98)
<b>(21) International Application Number:</b> PCT/FI98/00108  <b>(22) International Filing Date:</b> 5 February 1998 (05.02.98)  <b>(30) Priority Data:</b> 970508                      6 February 1997 (06.02.97)                      FI  <b>(71) Applicant (for all designated States except US):</b> TELECOM FINLAND OY [FI/FI]; Sturenkatu 16, FIN-00510 Helsinki (FI).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> JÄÄSKELÄINEN, Torsti [FI/FI]; Viiriläntie 31, FIN-01490 Vantaa (FI).  <b>(74) Agent:</b> PAPULA REIN LAHTELA OY; (Fredrikinkatu 61 A), P.O. Box 981, FIN-00101 Helsinki (FI).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** MODULAR GENERAL-PURPOSE DISTRIBUTION FRAME**(57) Abstract**

The invention relates to a modular general-purpose distribution frame for e.g. termination, cross-connection, and/or grounding of various conductors, cables, fibres, connectors and the like. The general-purpose distribution frame comprises at least one hollow body open at least on one side, preferably of a rectangular shape and forming a skeleton, i.e. a skeletal component (1), to which are attached various parts of the general-purpose distribution frame. By using the modular general-purpose distribution frame of the invention, different cross-connection frames can be flexibly and cost-effectively assembled.



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## MODULAR GENERAL-PURPOSE DISTRIBUTION FRAME

The present invention relates to a modular general-purpose distribution frame for e.g. termination, cross-connection, and/or grounding of various conductors, cables, fibres, connectors and the like.

For example, in a telecommunications environment there are dry spaces that need to be provided with distribution frames for termination, cross-connection and/or grounding of various conductors, cables, fibres and so on. Typically, these include e.g. symmetric paired cables, coaxial cables and individual fibres.

Prior-art distribution frames are known that are manufactured specifically for each installation and tailored according to the situation to make them suitable for use in the particular installation. By suitably combining parts of different lengths, distribution frames having a desired height and suited for the installation have been produced.

Prior-art distribution frame designs often comprise a large number of structural parts and the skeletal components of the distribution frames are often quite large, causing unnecessary occupation of storage space. The distribution frame is difficult to mount because it has not been possible to pre-equip the skeletal component of the frame during manufacture. Because of these circumstances, distribution frame designs manufactured specifically for each installation involve high expenses. A special problem are also the difficulties regarding maintenance and grounding of the system.

The object of the present invention is to achieve a remedy for the drawbacks mentioned above. A specific object of the present invention is to produce a new type of modular general-purpose distribution frame e.g. for the termination, cross-connection,

and/or grounding of various conductors, cables, fibres, connectors and the like.

A remedy for the drawbacks mentioned is obtained and the objects specified above are achieved  
5 by a modular general-purpose distribution frame characterised by what is presented in the characterisation part of claim 1.

The advantages achieved by applying the present invention include a reduced number of  
10 structural parts, easier manufacture of the structural parts because of the smaller design of the skeletal component, reduction of the size of the storage package and the possibility to pre-equip the skeletal component during manufacture. Moreover, the present  
15 invention reduces the costs, allows easier maintenance of the system and provides greater versatility and simpler grounding.

In the following, the invention will be described in detail by referring to the attached  
20 drawings.

Fig. 1 presents a skeletal component for a modular general-purpose distribution frame and illustrates the attachment of mounting brackets to mounting flanges.

25 Fig. 2 illustrates the attachment of a modular holding block to mounting brackets preferably used with a modular general-purpose distribution frame, and a few examples of different variations of the modular holding block.

30 Fig. 3 illustrates the attachment of a modular holding block to another set of mounting brackets preferably used with a modular general-purpose distribution frame.

35 Fig. 4 shows how several skeletal components of a modular general-purpose distribution frame are joined together to form a pillar-like structure and

presents the structural parts to be attached to the skeletal component.

The modular general-purpose distribution frame of the invention comprises at least one hollow body open at least on one side, preferably of a rectangular shape and forming a skeleton, to which various parts of the modular general-purpose distribution frame are attached. The hollow body forming a skeleton is hereinafter referred to as skeletal component 1. The inner surface of at least one of the solid walls of the skeletal component is provided with machined lobes serving to bind and/or fasten cables. Moreover, at least one open side of the skeletal component is provided with mounting flanges to allow mounting brackets, such as e.g. mounting brackets 10, to be detachably mounted in an optional mounting position. The mounting brackets preferably have a structure that allows the distance between them to be changed by changing the mounting position of at least one of the mounting brackets.

In Fig. 1, showing a preferred embodiment of the modular general-purpose distribution frame of the invention, braces 2 are attached to the ends of one of the open sides. Attached to the upper and lower ends of the front part are horizontal cable guides 5. Attached to one side are three vertical cable guides 6.

Fig. 2 presents a sectioned view of mounting brackets 10 designed to be attached to mounting flanges on the skeletal component 1 of a modular general-purpose distribution frame to permit the attachment of installation material. An example of this type of mounting bracket is the 25 x Krone bracket, in which the shape of the teeth is previously known from a solution developed by the German company Krone Ag for the attachment of a LSA+ slot connector. Using a male-female type joint, at least one modular

holding block, such as e.g. a connector plate 11 of a design like that shown in Fig. 2. Holding blocks 12 and 13 are examples of other preferred designs.

5 The holding block to be mounted on the mounting brackets 10 is preferably provided with slots of a size suitable for a mounting bracket tooth to pass through, and one edge of at least one of the slots is provided with a lug that fits into a hole in the mounting bracket tooth. It is to be noted in 10 particular that to the holding block attached e.g. to mounting brackets 10 it is possible to detachably attach e.g. a plate with markings, a cable clamp and/or a fibre guide.

Fig. 3 presents a sectioned view of another 15 set of mounting brackets 14 designed to be attached to mounting flanges on the skeletal component 1 of a modular general-purpose distribution frame 1 to permit the attachment of installation material. An example of this type of mounting bracket is the 25 x Pouyet 20 bracket, in which the slot pattern is previously known from a solution developed by the French company Poyet International for the attachment of a STG slot connector set. At least one modular holding block, such as a connector plate 15 of a design as 25 illustrated by Fig. 3, is detachably mounted on the mounting brackets 14. In the modular holding block, such as e.g. a connector plate 15, the upper and/or lower end sides are provided with cut-outs into which the bracket can be fitted. At least one cut-out is 30 provided with a lug that fits into a hole in the bracket.

Fig. 3 only presents an example of a modular holding block designed to be mounted on mounting brackets 14. This is naturally by no means meant to 35 limit the modular holding block attachable to mounting brackets 14 to a single design. Various mounting block designs are conceivable. It is to be noted in

particular that to the holding block attached e.g. to mounting brackets 14 it is possible to detachably attach e.g. a plate with markings, a cable clamp and/or a fibre guide.

5                Figures 2 and 3 present examples of preferred mounting bracket designs intended to be used in a modular general-purpose distribution frame, and modular holding blocks designed to be attached to them. This is by no means intended to limit the method  
10 of attachment of the modular holding block exclusively to the above-described mounting bracket designs.

              In Fig. 4, two skeletal components 1 of a modular general-purpose distribution frame according to the invention have been joined together one above  
15 the other in a pillar-like structure. The ends of the structure are provided with adapting end pieces 8, 8b and flanged parts 9. The flanged parts 9 partially fit into the adapting end piece 8 and/or 8b. As shown in Fig. 4, the modular general-purpose distribution frame  
20 is fastened by a flange part 9 onto a socle 7.

              At least one of the open sides of the skeletal component is closed with a cover 4. Further, attached to the brace 2 fitted to the upper part of the skeletal component to allow grounding of cable  
25 sheaths is a grounding strip 3 for external grounding.

              By joining an optional number of identical skeletal components 1 together, a cross-connection frame of desired height can be very flexibly constructed. It is to be noted that the modular  
30 general-purpose distribution frame can be suspended e.g. on a wall, assembled as a self-supporting pillar on the floor and/or attached to the ceiling of an equipment room. From the modules, it is easy to assemble even very large cross-connection frames.

35                The present invention has been described above by the aid of only one preferred embodiment. This is by no means intended to restrict the invention

exclusively to the example described above. It is obvious to the person skilled in the art that different embodiments are possible within the scope of the claims presented below.



## CLAIMS

1. Modular general-purpose distribution frame for e.g. termination, cross-connection, and/or grounding of various conductors, cables, fibres, connectors and the like, characterised in that the general-purpose distribution frame comprises at least one hollow body open at least on one side, preferably of a rectangular shape and forming a skeleton, i.e. a skeletal component (1).
2. General-purpose distribution frame as defined in claim 1, characterised in that at least two of said skeletal components (1) are joined together on top of each other in a pillar-like structure to build a connection frame of optional height.
3. General-purpose distribution frame as defined in claim 1 or 2, characterised in that at least one open side in the skeletal component (1) is provided with mounting flanges to allow mounting brackets to be detachably mounted in an optional mounting position.
4. General-purpose distribution frame as defined in any one of the preceding claims 1 - 3, characterised in that at least one of the ends of the skeletal component (1) has a brace member (2) attached to it to allow grounding of cable sheaths, and that the skeletal component is provided with an optional number of cable guides, preferably vertical and/or horizontal cable guides, attached to the skeletal component (5,6).
5. General-purpose distribution frame as defined in any one of the preceding claims 1 - 4, characterised in that the general-purpose distribution frame comprises at least one skeletal component (1), with mounting brackets for installation material detachably attached to the skeletal component, an optional number of vertical and/or

horizontal cable guides (5,6), at least one cover (4) and at least at one end a brace member (2) with a grounding strip (3) attached to it for external grounding.

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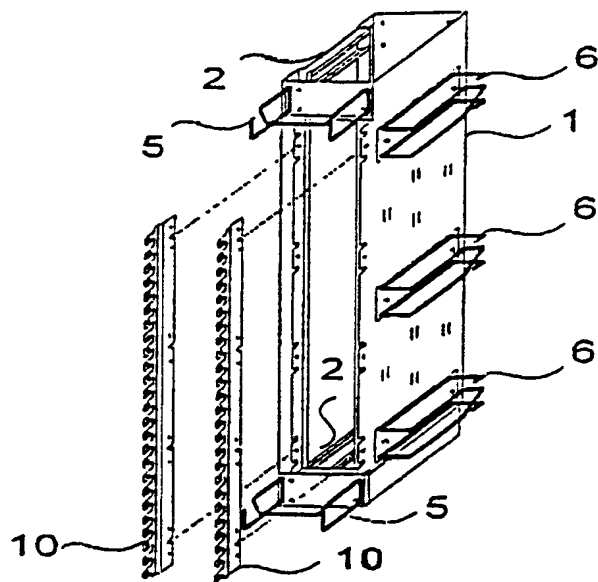
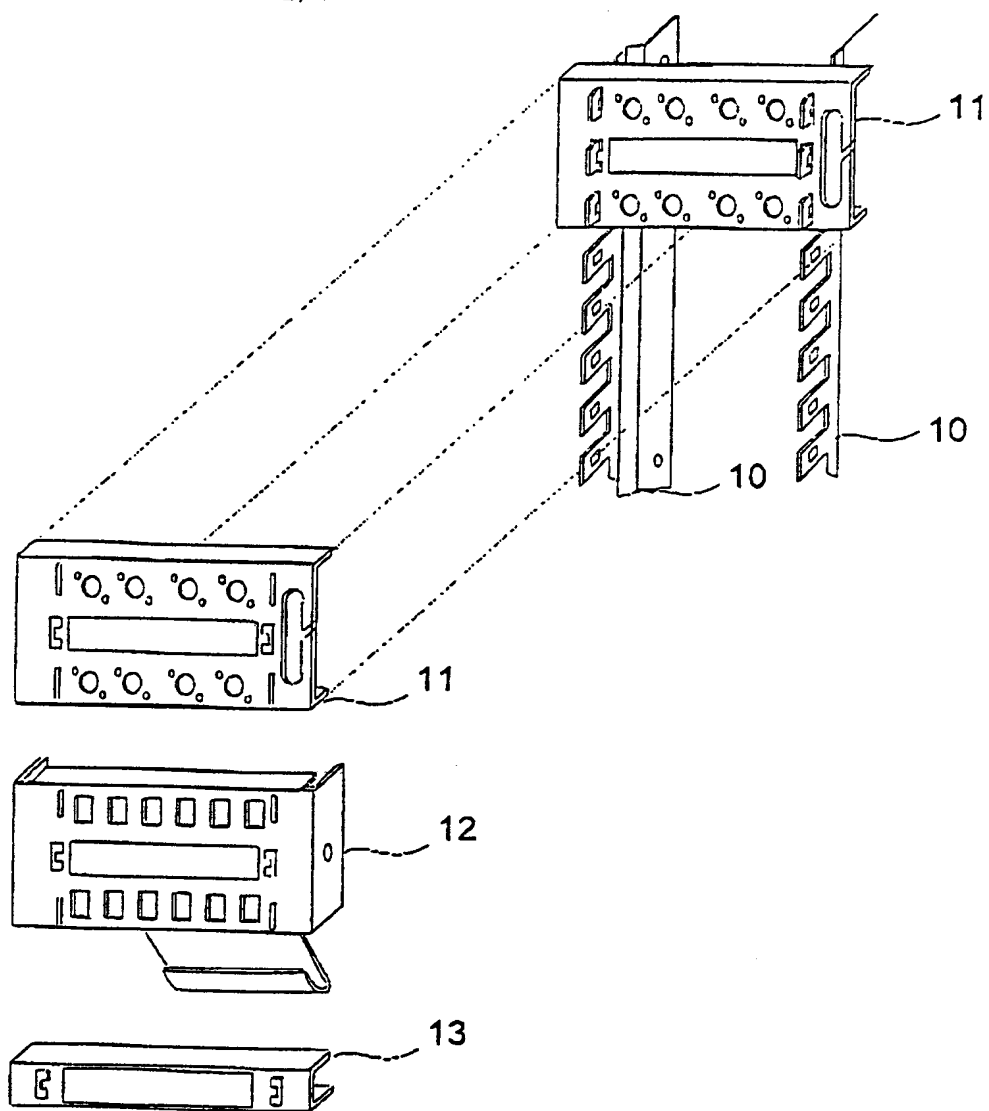


Fig 1

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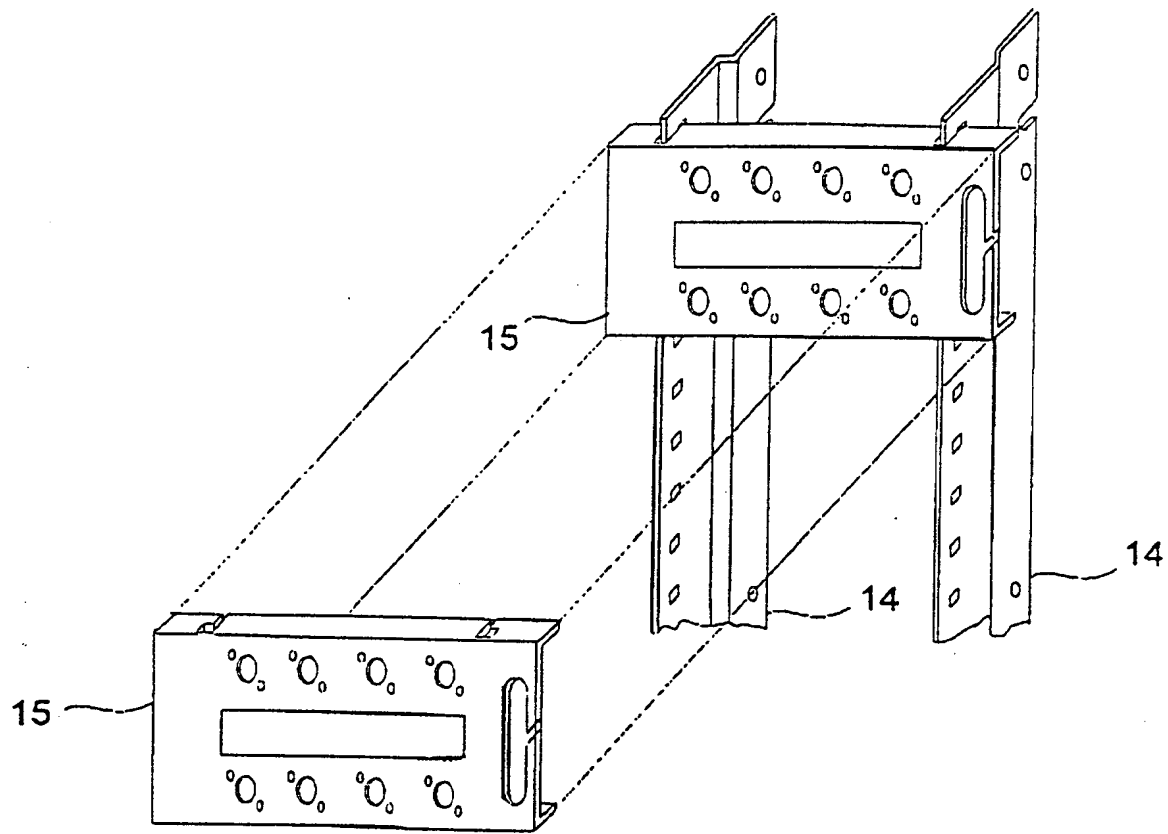


Fig 3

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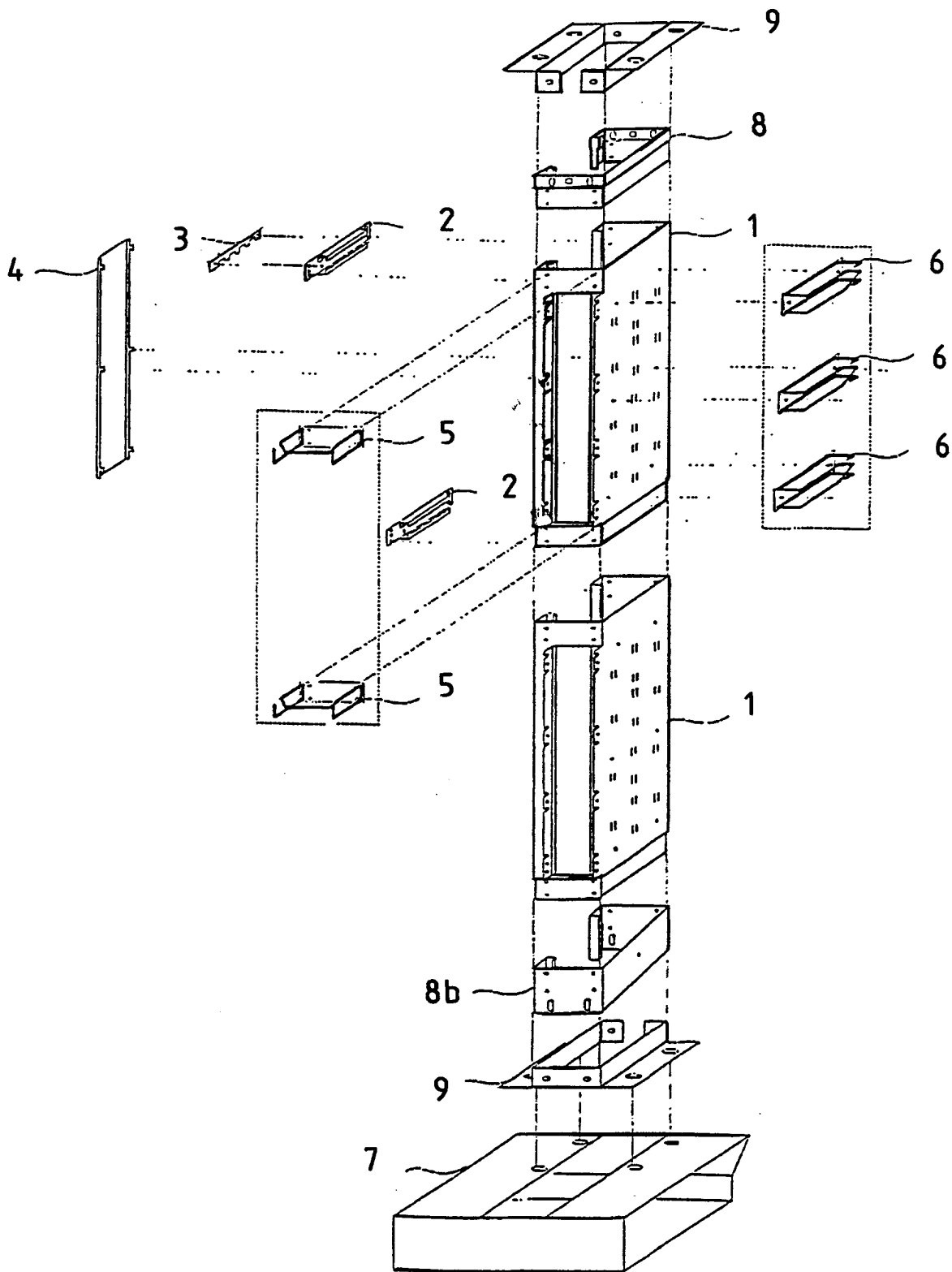


Fig 4

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 98/00108

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H02G 3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0058819 A2 (ZUMTOBEL GMBH & CO.), 1 Sept 1982 (01.09.82), page 7, line 1 - line 19; page 11, line 10 - page 12, line 28 --	1,3-5
X	EP 0305338 A2 (GANTENBEIM, U.), 1 March 1989 (01.03.89), column 3, line 60 - column 5, line 48, figures 1-6 --	1-5
X	FR 2722924 A1 (KNONE AKTIENGESELLSCHAFT), 26 January 1996 (26.01.96), figure, abstract --	1,3-5

☒ Further documents are listed in the continuation of Box C.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2727577 A1 (ELECTRIC PRODUCTION SOCIETE ANONYME), 31 May 1996 (31.05.96), figures 1-5, abstract  --	1,3-5
X	US 4860168 A (B.I. WILJANEN ET AL), 22 August 1989 (22.08.89), column 1, line 58 - column 2, line 68, figures 1,2  -- -----	1-5



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Information on patent family members

02/03/98

International application No.

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